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Sugar Beet Yields–Effect of April rainfall

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April rainfall could have two effects on beet yields; if it is too wet there might be sowing difficulties, and if it is too dry there might be a drought effect and poor germination or establishment of the seedlings.

The England and Wales 1950–69 data were analysed (using the 5 sample stations as in previous Ag.Mems.), with respect to –

I = improvement factor (years after 1950, maximum 10)
ET = effective transpiration; July–September (in)
H = potential transpiration, August–September (in)
A_D = deficit of April rain below 1 inch
A_E = excess of April rain over 1.5 inches

with the result

$$\text{Yield (tons/acre)} = 0.41\ I + 1.01\ ET + 2.11\ H - 3.49\ A_D - 1.05\ A_E - 6.13$$

with a multiple correlation of 0.90.

Results are shown in the Appendix, together with independent checks on the years 1970–3. These checks are satisfactory except for 1971, when the yield is underestimated.

Further analysis suggested that an early return to capacity in the autumn (as in 1960 and 1968), which will delay lifting, is associated with underestimates of yields, but this does not explain the 1971 error.

April soil temperatures appear to have little or no effect.

Any comments or suggestions on this paper should be referred to the author.

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Appendix

Year	Yield	I	ET	H	A_D	A_E	Estd Yield	Error
1950	12.3	0	7.15	4.9	0	0.35	11.1	−1.2
1951	10.8	1	6.95	4.9	0	0.5	11.1	+0.3
1952	10.5	2	6.15	5.0	0	0	11.5	+1.0
1953	12.8	3	6.9	5.3	0	0.7	12.5	−0.3
1954	10.5	4	7.5	4.5	0.7	0	10.1	−0.4
1955	10.8	5	4.75	5.3	0.25	0	11.0	+0.2
1956	12.3	6	7.65	4.4	0	0.5	12.8	+0.5
1957	10.6	7	7.35	4.3	0.8	0	10.4	−0.2
1958	13.3	8	8.45	4.7	0.35	0	14.4	+1.1
1959	12.7	9	4.1	5.6	0	0.85	12.6	−0.1
1960	16.8	10	7.85	4.7	0.1	0	15.5	−1.3
1961	14.1	10	6.75	5.0	0	1.25	14.0	−0.1
1962	12.7	10	6.45	4.5	0	0.25	13.7	+1.0
1963	12.6	10	6.5	4.3	0	0.5	13.1	+0.5
1964	14.2	10	4.45	5.6	0	0.45	13.8	−0.4
1965	14.9	10	7.5	4.7	0	0.15	15.3	+0.4
1966	14.7	10	7.55	5.0	0	1.2	14.9	+0.2
1967	14.9	10	6.25	4.5	0	0.05	13.7	−1.2
1968	15.2	10	7.3	4.2	0	0.4	13.8	−1.4
1969	13.1	10	6.75	4.4	0	0.25	13.8	+0.7
Check years								
1970	13.8	10	6.35	5.0	0	0.75	13.9	+0.1
1971	16.7	10	6.6	4.7	0	0.2	14.3	−2.4
1972	13.1	10	5.35	4.8	0	0.05	13.4	+0.3
1973	15.3	10	6.9	5.1	0	0.4	15.3	0.0